

Maryland Sea Grant Schools Network News

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Feature Article: VIRTUE Project

A popular buzzword today in internet lingo is "interactive". To most web users that means ending up on a webpage somewhere clicking through a series of pictures or watching a video clip. While these types of media look nice, the interaction is limited to simply "pointing" and "clicking". Maryland Sea Grant has recognized the need for a more user driven approach to interaction on the web; a series of sites where web users can input data and information and receive feedback within seconds.

Last year, Maryland Sea Grant posted a unique interactive lesson designed for Maryland students and teachers called Biofilms and Biodiversity (www.mdsg.umd.edu/MDSG/Education/biofilm/index.htm). This lesson is based upon a current research project at the Center of Marine Biotechnology that focuses on biofilm formation in the marine environment and it's relationship to biofouling (aka - the nasty "stuff" you find growing on the bottom of a boat).

Features of this lesson include:

An *Introduction* page to the broad topic of microbial biofilms in our world.

A *Featured Creatures* page that displays and describes aquatic organisms commonly found in biofilm communities in Maryland.

A *Tutorial* page on the use of biotic indices to analyze biofilm populations.

A *Virtual Samples* page of two biofilm communities from Baltimore's Inner Harbor where users can perform simulated data analysis.

A *Performance Assessment* page that challenges users to apply their knowledge about the relationship of water quality, biodiversity, and depth.

A series of *Experimental Design* pages that help the user implement their own field experiment and analyze raw data in real-time on the web.

A *Links* page provides users with additional background information.

A *Teacher Resource* page that describes the connection of national and state core learning goals to the Biofilms and Biodiversity lesson.



<http://mdsg.umd.edu/MDSG>

Partnerships are currently forming involving this project - locally, nationally, and internationally (see Virtue Article on page 2).

In the future, Maryland Sea Grant will develop other lessons based upon other University supported research and education programs, emphasizing user interaction and applicability in the classroom.

Coming Web Attractions: Oysters & Aquaculture



A second step toward improving outreach and education took place on Oct. 5, 1998. The public outreach committee, headed by Dr. Wayne Bell (UMCES) and Dr. Roger Lindblom (Goteborg University), organized a video conference between teachers in Maryland, Goteborg, and Norway. Six teachers from Maryland, Brian Stoll, Dale Johnsen, Dale Peters, Ann Williams, Pat Chambers and Jim Gilford, represented a group that had participated as 1998 Summer Research Graduate Fellows at the Center of Marine Biotechnology, Horn Point Laboratory, Chesapeake Biological Lab, and Maryland Sea Grant. The focus of the meeting was the description of a biofilm and biodiversity project, initiated by the Center of Marine Biotechnology and Maryland Sea Grant, that can be utilized as an extension in science classes to study aquatic



The VIRTUE Project (**V**irtual **U**niversity **E**ducation), under the sponsorship of the Swedish-based Wallenberg Foundation, involves a collaboration between the University of Bergen (Norway), the University of Maryland, and Goteborg University (Sweden) to develop research projects, outreach, and education programs that will address common concerns about the marine environment and expand innovative educational techniques. A major goal of the project is the enhancement of life-long learning involving public outreach and teacher education in the area of marine science. One of the first steps was the development of an "on-line marine science magazine" (www.virtue.uib.no/magazine) dedicated to the description and depiction of various research projects at the three institutions. The site describes unique projects that range from plankton in the marine environment to molecular biology. The site also includes a "teaching tools" section that can help enhance classroom content. Feature lessons posted at this time include Using Plankton in the Classroom and Biofilms and Biodiversity. Both lessons provide extensive information and excellent techniques.

ecosystems. The project has been implemented at a few high schools in Maryland that have access to a local stream or river. Brian Stoll, Woodlawn High School, described the biofilm research he performed at COMB during the summer and how he planned to implement techniques and strategies in his classroom. In addition, Jim Gilford, Westminster High School, described how he used the Maryland Sea Grant biofilms and biodiversity web lesson as a research project the first 3 weeks in his science research class. The conference lasted one hour with an exchange of information in hopes that Swedish and Norwegian teachers would like to collaborate in the future and



Experimental Biofilm Disk after three month in Baltimore Harbour

exchange data.

Since that first meeting, the teachers from Maryland have been implementing various parts of the biofilm project in their classroom by studying field samples or using the Biofilms and Biodiversity lesson on the Maryland Sea Grant web-site as an enhancement. On March 22, 1999, the second VIRTUE Project outreach meeting will occur here in Maryland at the Center of Marine Biotechnology to outline a specific biofilm investigation that all three collaborating countries can perform

starting this spring. There is great interest from the VIRTUE outreach committee in investigating the potential for an exchange program between

Maryland, Goteborg, and Bergen for teachers participating in the investigation. This would be the first of many future exchanges of information and resources in the years to come

VIRTUE Project ...

"Changing the way of teaching"

that would help enhance science education in Maryland and internationally.

For more information on this program contact, Adam Frederick at 410-234-8850 or frederic@mdsg.umd.edu.

Sea Grant / Space Grant Summer Internships for Teachers

The Maryland Sea Grant College Program and Maryland Space Grant Consortium, in collaboration with the Towson University Maryland Educator's Summer Research Program, will award another series of research internships to middle school and high school mathematics and science teachers for summer 1999.

Get on board with the Chesapeake Bay Education Initiative...

Learn how to access, apply, and interpret authentic environmental data about the Chesapeake Bay and its watershed, and the Maryland Coastal Bays...

Get hands-on experience in environmental technology, remote sensing, GIS, real-time monitoring, or landscape ecology...

Immerse yourself in a summer research project under the direct supervision of a faculty member at the UMCES Appalachian Lab, Chesapeake Biological Lab, Horn Point Lab, the UMBI Center of Marine Biotechnology, or the Smithsonian Environmental Research Center ...

And earn a stipend of \$500 per week for 8 weeks.

For more information contact Dr. Wayne Bell, Vice President for External Relations, University of Maryland Center for Environmental Science at 410-228-9250, ext. 608.

Operation Pathfinder/Coast Summer Course National Sea Grant

The "Consortium for Oceanographic Activities for Students and Teachers," or COAST, is a working collaborative designed to effectively deliver oceanographic and coastal processes education to pre- and in-service teachers from kindergarten through the twelfth grade (K-12). Each of the COAST members offers expertise in different areas and through focused efforts at specific educational levels provides depth of knowledge and resources in these areas. As a collaborative, the partners provide the broadest spectrum of means, methods and materials for ocean science education, as well as a nationwide telecommunications infrastructure.

Fully Supported Program Providing: Full tuition, Room and board, Travel allotment, \$300 Stipend, 3-semester credits, Resource book, and other complementary materials.

Dates: June 18 - July 2, 1999.

Locations: Virginia Institute of Marine Sciences and Nags Head, North Carolina.

Application and Information: Check it out on the web at

<http://www.ims.usm.edu/~jlscott/coast01.htm>

Educator



Dale Johnsen
Watkins Mill High School

"Up Close"

Degree: Salisbury State University on full academic scholarship for Maryland teachers.

Experience: 8 year at Watkins Mill High School, Montgomery County and 2 year at Springbrook High School, Montgomery County.

Subject: 10th - 12th grade honors and AP biology.

"Most Memorable" Teaching Experience: A weekend trip to Cape Cod, Massachusetts in 1995 with 40 high school students to whale watch. Plans were shortly altered by a major Noreaster. "Imagine 40 high school boys and girls trapped in a hotel for two days with no TV". On Sunday the weather broke and students were able to get a glimpse of a whale before heading back home.

Favorite Class Trips: Chesapeake Bay Foundation day trips to Merrideth Creek and sailing on the skipjack.

Awards and Grants: Received a grant from the Chesapeake Bay Trust for stream studies and equipment for a traveling field lab. In 1996, Dale received a personal award from the Maryland Ornithological Society to study birds on Hog Island, Maine at the Audubon Camp. This past year she received a grant from Montgomery County Public Schools for Innovative Lessons to build a second aquaculture system.

Teaching Techniques: Each year her students are required to design and implement an environmental project that involves the community. Projects range from stream restoration to the benefits of composting.

Future Plans: Develop a new science research course at Watkins Mill High School so that students will have a greater opportunity to perform long term experiments. She would also like to do some consulting in science education in the state of Maryland.

Dale Johnsen was one of the 14 teachers that attended the Aquaculture in Action Workshop this past summer. She is currently working with the Dept. of Natural Resources raising largemouth bass for a restocking program in the Patuxent River. She is also one of the Maryland teachers participating in the VIRTUE Outreach Project.

Program



SEARCH

Historical Ecology of Chesapeake Bay

"Up Close"

The Solomons Environmental and Archaeological Research Consortium (SEARCH) is offering a unique Environmental Science program for St. Mary's and Calvert County high school students this summer. The **Historical Ecology of the Chesapeake Bay**, will give incoming sophomores, juniors, and seniors the chance to see environmental science, marine ecology, history, and archaeology from the inside, and take part in new worlds of discovery as an active participant.

During the two week, non-residential program, students will have the opportunity of participate in a research cruise aboard the *R.V. Aquarius* and conduct experiments at the **Chesapeake Biological Laboratory**; explore the geological history of the Bay at the **Calvert Marine Museum**; examine stream macroinvertebrate communities at **St. Mary's College of Maryland**; excavate an archaeological site at **Jefferson Patterson Park and Museum of the Maryland Historical Trust**; examine pollen cores, animal remains, historical maps, and other evidence to assess historical environmental changes at **Historic St. Mary's City**; measure environmental impact on the Patuxent River at **The Academy of Natural Sciences Estuarine Research Center**; and participate in oyster restoration activities at the Department of Natural Resources, Piney Point Oyster Nursery.

A mentorship program will be available to students interested in pursuing independent research projects resulting from this course.

For more information on this program contact:
Jackie Takacs, Maryland Sea Grant Extension Program,
410-326-7356 or takacs@cbl.umces.edu.

Jr. Watermen's Program

For a second year the East Coast Commercial Fisherman's and Aquaculture Expo offered programs for all ages and backgrounds. The Jr. Watermen's Program was a four hour hands-on outreach activity designed to expose it's participants to the fields of fishing and marine science. Five organizations helped give kids the opportunity to participate in everything from a casting contest to observing the organ-



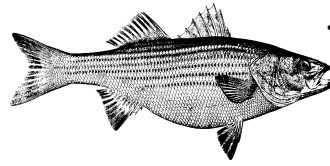
Stephanie Tobash, Research Assistant at Horn Point Lab, shows some budding marine scientists the finer points of the oyster bar community.

isms of an oyster bar community. The successful participation of NOAA/Chesapeake Bay Office, Maryland Dept. of Natural Resources, Virginia Sea Grant, and the Cast-A-Ways Jr. BASS club is coordinated by the Maryland Sea Grant Extension Program and lead by Jackie Takacs.

Throughout the course of the Program, kids (and adults) participated in the various stations that were set-up. A highlight of the program was the opportunity for all to design their own T-shirt once they successfully completed each station.



Hands-on experiences with live animals like horseshoe crabs and diamondback terrapin turtles were available at the "touch-tank" supplied by the MD Dept of Natural Resources.



Aquaculture-in-Action Update

Have Fish, Will Travel

On December 4, 1998, 120 striped bass made their way across Maryland to five schools. The morning started at about 5:30am for two Maryland Sea Grant educators - Adam Frederick and Jackie Takacs. After meeting for bagels and coffee, they headed to Horn Point Laboratory to pick up striped bass fingerlings from Dr. Reggie Harrell, Finfish Aquaculture Specialist for Maryland Sea Grant. Despite any and all doubts about the "fish truck" being able to handle it's impending task - it rolled into North County High School (Anne Arundel County) at 9:45am for the first delivery to Valerie Wesner's class. From there the three (Adam, Jackie



Stripers being acclimated to the aquaculture system at North County High School.

and the Truck), ventured into Carroll County for two stops - The Gateway School (Steve Luetette) and Francis Scott Key High School (Bob Cole). The final deliveries required traveling across the piedmont into Frederick County. Striped bass found their way into the aquaculture systems of Ron Albaugh (Middletown High School) and Dale Peters (Urbana High School). After a side detour to recover a salinity meter that was left behind in Carroll County, the truck made it home at 7:00pm!

The striped bass are part of the Aquaculture in Action project that focuses on the raise and release of local species in Maryland. The hope is that the use of aquaculture will help improve science education in the classroom. At the end of the school year there will be a striper "release day" involving each of the classes within the Aquaculture in Action network.



The infamous Horn Point Fish Truck

The BRIDGE

By Lisa Lawrence

It can be difficult for teachers to find current marine science information to incorporate into their curricula. Often, textbook material is limited and outdated. Information can be obtained by contacting research facilities or aquariums, but that can be time-consuming and the knowledge gleaned may be too narrowly focused or technical. Plenty of information exists on the World Wide Web - a search on the words "marine science education" can produce as many as 10,000,000 hits - but it can take days to weed through the listings and to discern what are credible and useful sources. *The Bridge*, a unique on-line marine science clearinghouse, speeds visiting teachers to the best marine education resources available on-line. Here, teachers find educator and scientist reviewed materials on almost any marine-related topic, from academic programs to zebra mussels, with just a few "clicks".

Visitors access *The Bridge* through the National Marine Educators Association (NMEA) home page [<http://www.marine-ed.org/>]. In addition to information on marine science topics, the site offers links to marine science research data, aquariums and research institutions, lesson plans, career information, and Scuttlebutt, a discussion list for marine educators and scientists. A special section on professional development includes teacher programs, summer opportunities, professional organizations, and grants and awards.

The Bridge is regularly undated with new sites and special sections. Newly added sites include U.S. regional pages with links to resources specific to the Atlantic, Pacific, Gulf, and Great Lakes areas. Also on the site are forms for teacher comments, suggestions, and site recommendations. Educators interested in contributing to *The Bridge* project can join the TROLL (Teacher Reviewer of On-Line Learning) committee and review websites for inclusion on *The Bridge*.

The Bridge is a National Oceanographic Partnership Program project and is sponsored by NMEA and the national network of Sea Grant educators. The Virginia Institute of Marine Science coordinates the project. For more information, contact webkeeper, Lisa Ayers Lawrence at, ayer@vims.edu.

SciTech

**Center of Marine Biotechnology
Maryland Sea Grant Extension
Program**

Fall Schedule

The University of Maryland Biotechnology Institute's Center of Marine Biotechnology (COMB) and Maryland Sea Grant Extension Program are offering unique lab-based experiences for high school students in the Columbus Center in Baltimore, MD. The SciTech Education Program focuses on translating the research at the

Center of Marine Biotechnology into "hands-on" experiences for students. The SciTech labs are equipped with a wide variety of technical equipment that provide students and teachers with many "first-time" opportunities. Featured are the Olympus research microscopes that enable students and teachers to capture video and images of their experience to take back to the classroom and use for follow-up projects in school (be sure to bring a blank VHS tape and MAC or PC floppy disks). The SciTech Education Program also includes a seminar with a scientist from COMB so students can learn about careers and choices in the science field.

The content of the lab experiences integrate a variety of disciplines and relate to societal concerns that are easy for students to grasp. This spring the SciTech Education Program is offering four lab-based experiences:

Sept:
Oct: Biofilms & Biodiversity
Nov: Natural Products & Biodiversity
Dec: Zebrafish Embryology

To receive more information about these and other programs call (410) 576-5778 or check them out on the web at <http://www.umbi.umd.edu/~scitech>.



MSGSNN

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